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MARSHALL O'TOOLE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/663,618	06/14/96	GRAY	27866/32960

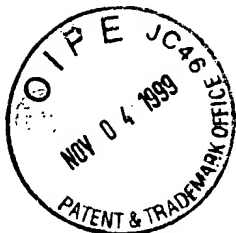
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EXAMINER
PROUTY, R

ART UNIT 1814
PAPER NUMBER 6

DATE MAILED: 07/07/97

DOCKETED: 10/2/97



Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks



Office Action Summary

Application No. 08/663,618	Applicant(s) Gray
Examiner Rebecca Prouty	Group Art Unit 1814

- ☐ Responsive to communication(s) filed on _____.
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

- ☒ Claim(s) 1-31 is/are pending in the application.
- Of the above, claim(s) 19-25, 28, 30, and 31 is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1-18, 26, 27, and 29 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☒ Claims 1-31 are subject to restriction or election requirement.

Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
- ☐ received.
- ☐ received in Application No. (Series Code/Serial Number) _____.
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

- ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- ☒ Notice of References Cited, PTO-892
- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☐ Interview Summary, PTO-413
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-18, 26, 27, and 29, drawn to DNA, vectors, and host cells encoding human chitinase, classified in class 435, subclass 252.3.
- II. Claims 19-25 and 28, drawn to human chitinase, classified in class 435, subclass 209.
- III. Claims 30 and 31, drawn to human chitinase antibodies and hybridoma, classified in class 435, subclass 331.

The inventions are distinct, each from the other because of the following reasons:

The DNA of Group I and the proteins of Groups II and III are patentably distinct compounds because they are each chemically different compounds, the DNA has other utility besides encoding the proteins of Group II such as a hybridization probe and these proteins can be made by another method such as isolation from natural sources or chemical synthesis and the proteins of Group II have other utility besides acting as an antigen to induce the antibodies of Group III such as a chitinase.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter as shown by their

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different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Li-Hsien Rin-Laures on 6-27-97 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-18, 26, 27, and 29. Affirmation of this election must be made by applicant in responding to this Office action. Claims 19-25, 28 and 30-31 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claims 13-18 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for nucleic acids encoding the amino acid sequences of SEQ ID NOS: 2 or 4, does not reasonably provide enablement for any nucleic acid which will hybridize under stringent conditions to a nucleic acid encoding the amino acid sequence of SEQ ID NOS: 2 or 4. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Claims 13-18 are so broad as to encompass any nucleic acid which will hybridize under stringent conditions to a nucleic acid

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encoding the amino acid sequence of SEQ ID NOS: 2 or 4. The scope of the claims is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of chitinase genes broadly encompassed by the claims. Since the amino acid sequence of a protein determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires a knowledge of and guidance with regard to which amino acids in the protein's sequence, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the proteins' structure relates to its function. However, in this case the disclosure is limited to the nucleotide and encoded amino acid sequence of two allelic variants of a single chitinase.

While recombinant and mutagenesis techniques are known, it is not routine in the art to screen for multiple substitutions or multiple modifications, as encompassed by the instant claims, and the positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of

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success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions.

The specification does not support the broad scope of the claims which encompass any nucleic acid which will hybridize under stringent conditions to a nucleic acid encoding the amino acid sequence of SEQ ID NOS: 2 or 4 because the specification does not establish: (A) regions of the protein structure which may be modified without effecting chitinase activity; (B) the general tolerance of chitinases to modification and extent of such tolerance; (C) a rational and predictable scheme for modifying any chitinase residues with an expectation of obtaining the desired biological function; and (D) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the

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claimed invention in a manner reasonably correlated with the scope of the claims broadly including genes encoding an enormous number of amino acid modifications of the chitinases of SEQ ID NOS: 2 or 4. The scope of the claims must bear a reasonable correlation with the scope of enablement (In re Fisher, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of chitinase genes having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-6, 13-18, 26 and 27 are rejected under 35

U.S.C. 102(a) as being anticipated by Boot et al.

Boot et al. teach a gene encoding a human chitinase, expression vectors including this gene, transfection of these vectors into COS cells and expression and isolation of the chitinase therefrom. The nucleotide sequence of the coding

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region of the gene disclosed by Boot et al. is identical to the coding region of SEQ ID NO: 1.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-12 and 29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Boot et al.

Boot et al. is discussed above. The gene of Boot et al. differs from that of the instant claims at a single nucleotide resulting in a single amino acid change in the encoded chitinase.

The minor variants of the gene claimed by applicants would have been obvious to one of ordinary skill in the art as the disclosure of a gene clearly suggests to one of ordinary skill in the art its allelic variants as allelic variation within the human genome is well known to the ordinary skilled artisan. As such the specifically claimed nucleic acids would have been obvious to one of ordinary skill in the art. Furthermore, it

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would have been obvious to one of ordinary skill in the art to insert these genes into any known vector/host cell system, such as that taught by Boot et al., and to express and isolate the encoded chitinase therefrom.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rebecca Prouty, Ph.D. whose telephone number is (703) 308-4000. The examiner can normally be reached on Monday-Friday from 8:30 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert A. Wax, can be reached at (703) 308-4216. The fax phone number for this Group is (703) 305-7401.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to robert.wax@uspto.gov.

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark Office on February 25, 1997 at 1195 OG 89.

Serial Number: 08/663,618

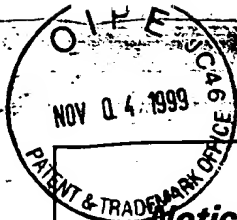
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0196.

A handwritten signature in cursive script, reading "Rebecca Prouty".

Rebecca Prouty
Primary Examiner
Art Unit 1814



Notice of References Cited

Application No. 08/663,618	Applicant(s) Gray		
Examiner Rebecca Prouty		Group Art Unit 1814	Page 1 of 1

U.S. PATENT DOCUMENTS

	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
A					
B					
C					
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E					
F					
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K					
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M					

FOREIGN PATENT DOCUMENTS

	DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
N						
O						
P						
Q						
R						
S						
T						

NON-PATENT DOCUMENTS

	DOCUMENT (Including Author, Title, Source, and Pertinent Pages)	DATE
U	R.G. Boot et al., "Cloning of a cDNA Encoding Chitotriosidase, a Human Chitinase Produced by Macrophages. J. Biol. Chem. 270 (44): 26252-6.	11/95
V		
W		
X		